

REMARKS

Claims 1-10 were in issue. Claims 1-10 have been amended. New claims 11 and 12, in Beauregard form and based on existing claims 7 and 8, have been added. No claims have been canceled. No new matter has been added. Thus, claims 1-12 are presented and at issue.

The Amendments

Each of the claims has been amended to positively recite that the methods produce an output of information (which may be in the form of a display, or creation of a stored record).

The §101 Rejection

The Examiner has rejected claims 1-3, 5, 7, and 9 under 35 U.S.C. §101 as covering non-statutory subject matter. Applicant respectfully traverses this rejection with respect to the claims as amended because such claims are statutory subject matter as being directed to a method that has practical application and which generates a concrete, useful, and tangible result.

The test asserted by the Examiner is incorrect. The proper test for patentability of processes that involve mathematical algorithms does *not* require that the “results [be] utilized after they are generated to make a machine function differently.”

In *State Street Bank & Trust Co. v. Signature Financial Group, Inc.*, 149 F.3d 1368 (Fed. Cir. 1998), the Federal Circuit applied a basic two-part test for patentable subject matter:

- 1) Does the claim, properly construed, come within one of the four statutory categories defined in §101 (*i.e.*, a “process, machine, manufacture, or composition of matter”)?
- 2) If so, the invention is patentable subject matter *unless* the claims are directed to “laws of nature, natural phenomena, and abstract ideas”.

Here, there is no question that the claims in issue recite a process. Thus, they are statutory subject matter unless they are directed to “laws of nature, natural phenomena, and abstract ideas”.

To determine whether a mathematical algorithm comes within the abstract ideas exception to patentability, the Federal Circuit in *State Street* went on to define and apply the following test to the specific facts before it: to be patentable, a claim directed to an apparatus involving a mathematical algorithm must encompass three aspects:

- (1) a transformation of data;
- (2) by a machine; and
- (3) production of a useful, concrete, and tangible result.

The Federal Circuit reasoned as follows:

“Unpatentable mathematical algorithms are identifiable by showing they are merely abstract ideas constituting disembodied concepts or truths that are not ‘useful.’ From a practical standpoint, this means that to be patentable an algorithm must be applied in a ‘useful’ way. ...

Today, we hold that *the transformation of data*, representing discrete dollar amounts, *by a machine through a series of mathematical calculations* into a final share price, *constitutes a practical application of a mathematical algorithm, formula, or calculation, because it produces ‘a useful, concrete and tangible result’*—a final share price momentarily fixed for recording and reporting purposes and even accepted and relied upon by regulatory authorities and in subsequent trades.”
[Emphasis added]

Notably, the output of the invention in issue in *State Street* was a final share price momentarily fixed for recording and reporting purposes — a number that had practical application *only* by reason of it being useful to humans who read and understood it, such as regulatory authorities or brokers who might use the number in subsequent trades.

It is also notable that the holding in *State Street* was broadened by the Federal Circuit just a few months later in *AT&T v. Excel Communications*, 172 F.3d 1352 (Fed. Cir. 1999). There, the Federal Circuit applied the *State Street* reasoning to method claims and broadened the test for patentable subject matter to eliminate the “transformation of data” step and the express “by a machine” step, from the *State Street* analysis.

In *AT&T v. Excel*, the invention called for the addition of a data field into a standard message record to indicate whether a long-distance telephone call involved a particular carrier.¹ The PTO granted the patent to AT&T without questioning whether the claims were directed to statutory subject matter under §101. In a suit brought by AT&T against Excel, the trial court granted summary judgment, holding that the AT&T patent was invalid for lack of statutory subject matter, as being drawn to a mere mathematical algorithm (other claim elements being characterized as preliminary data gathering steps for the mathematical algorithm).

The Federal Circuit acknowledged that “this court (and its predecessor) has struggled to make our understanding of the scope of §101 responsive to the needs of the modern world.” Nevertheless, the Court noted that “sea-changes in both law and technology stand as a testament to the ability of law to adapt to new and innovative concepts, while remaining true to basic principles.”

The Court held that “our inquiry here focuses on whether the mathematical algorithm is applied in a practical manner to produce a useful result”:

“The PIC indicator represents *information* about the call recipient’s PIC, a useful, non-abstract result that facilitates differential billing of long-distance calls made by an IXC’s subscriber. *Because the claimed process applies the Boolean principle to produce a useful, concrete, tangible result without pre-empting other uses of the mathematical principle, on its face the claimed process comfortably falls within the scope of §101.* [Emphasis added]

¹ The claim in issue in *AT&T v. Excel* was as follows:

“1. A *method* for use in a telecommunications system in which interexchange calls initiated by each subscriber are automatically routed over the facilities of a particular one of a plurality of interexchange carriers associated with that subscriber, said method comprising the steps of:

- [a] *generating a message record* for an interexchange call between an originating subscriber and a terminating subscriber, and
- [b] including, in said message record, a primary interexchange carrier (PIC) indicator [i.e., a Boolean flag] *having a value which is a function of whether or not the interexchange carrier associated with said terminating subscriber is a predetermined one of said interexchange carriers.*” [Emphasis added]

The Court rejected Excel's argument that because the process claims at issue lacked physical limitations set forth in the patent, the claims were not patentable subject matter:

"This argument reflects a misunderstanding of our case law. The cases cited by Excel for this proposition involved machine claims written in means-plus-function language. *See, e.g., State Street*, 149 F.3d at 1371, 47 USPQ2d at 1599; *Alappat*, 33 F.3d at 1541, 31 USPQ2d at 1554-55. Apparatus claims written in this manner require supporting structure in the written description that corresponds to the claimed "means" elements. *See* 35 U.S.C. § 112, para. 6 (1994). *Since the claims at issue in this case are directed to a process in the first instance, a structural inquiry is unnecessary.* [Emphasis added]

Based on *State Street* and *AT&T v. Excel*, the test for determining whether a mathematical algorithm comes within the abstract ideas exception to patentability can be restated as follows — to be patentable, a claim directed to an invention involving a mathematical algorithm must encompass at least:

- (1) application of the algorithm in a practical manner,
- (2) to produce a useful, concrete, and tangible result.

In the present case, the claims as amended meet both requirements. Taking claim 1 as exemplary, it now recites:

1. A method for analyzing the capacity of an application executing on a parallel processing system and expressed as a graph of vertices, comprising the steps of:
 - (a) creating a description of the sizes of data records throughout the graph;
 - (b) creating a performance description of each vertex in the graph;
 - (c) determining an execution time for each vertex in the graph;
 - (d) determining counts of data records assigned to corresponding vertices in the graph; and
 - (e) *outputting a description of the total execution time and performance of the system based on the determined execution time and counts of data records.*

This method represents the practical application of a method that provides an answer to users of the capacity of an application executing on a parallel processing system and expressed as a graph of vertices. In particular, the method of claim 1 outputs a description of the total execution time and performance of the system based on the determined execution time and counts of data records. This

result is useful to users interested in knowing before hand how long a particular computation will run. This result is concrete in that it provides a specific, reproducible result to specific inputs. This result is tangible in that it is made available as an output, and is thus not ephemeral or inaccessible. Accordingly, the invention as now claimed meets the statutory subject matter tests of *State Street* and *AT&T v. Excel*.

Applicant submits that this case is now in condition for allowance. Therefore, Applicant respectfully requests reconsideration and reexamination of the present application and allowance of the case at an early date.

Please apply any credits or charge any deficiencies to our Deposit Account No. 06-1050.

Respectfully submitted,

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